Tierra Responses to Comments on Newark Bay Study Area
SQT and Porewater Field Report (Tierra Solutions, Inc., July 2016)
March 15, 2017

Comment No.	Section	Page	Comment	Tierra Response
N/A	General	General	N/A	"Ponar" and "ponar" were changed throughout the report to PONAR since the name is the acronym for the inventors, Charles E. **P**owers, Robert A. **O**gle, Jr., Vincent E. **N**oble, John C. **A**yers, and Andrew **R**obertson (https://www.gvsu.edu/wri/education/instructors-manual-bottom-sampling-31.htm).
N/A	Section 2.5.1	Page 6 of 12 (PDF page 17)	N/A	The second sentence of the first paragraph of Section 2.5.1 will be revised as follows: "Sediment samples were mixed until textural, color, and moisture homogeneity ~~was~~were achieved."
1	Section 1.0 Introduction Item 1	Bottom of Page 1 to Page 2 of 6 (PDF pgs. 6-7)	Please clarify or edit the phrase "…identify potential cause-and-effect relationships between two or more of the components," (page 1-2). Sediment chemistry is the only stressor (causal) factor of the three SQT components listed; the other two components are measures of effect. Observed biological response in the absence of comparatively elevated sediment contaminants would suggest that another stressor may be present in the system.	The third sentence of item #1 at the top of page 2 of 6 in Section 1.0 will be revised as follows: "The SQT method incorporates a combination of both quantitative and qualitative analyses to identify if there are apparent~~potential~~ cause-and-effect relationships between sediment and/or porewater chemistry and other SQT components~~two or more of the components~~."
2	Section 1.0 Introduction	First full paragraph on Page 2 of 6 (PDF page 7)	Please replace the phrase "model ingestion of chemicals" with either "model trophic transfer of chemicals" or "model chemical exposure."	The last sentence of the first full paragraph on page 2 of 6 in Section 1.0 will be revised as follows: "This tissue data will be used to help assess risks to invertebrates, and will also be used to model

				trophic transfer of chemicals~~model ingestion of chemicals~~ to upper trophic level wildlife receptors (e.g., birds and mammals)."
3	Section 1.0 Introduction	Last paragraph on Page 2 of 6 (PDF page 7)	To be consistent with the SQT QAPP, please add the following sentence to the last paragraph on Page 2 of 6: "Some of these sediment samples will be collected from the sample locations as intertidal area samples for the SQT evaluation, and some will be additional, non-SQT samples from other target shoreline locations."	The following sentence will be added to the end of the last paragraph on page 2 of 6: "Some of these sediment samples were collected from the sample locations as intertidal area samples for the SQT evaluation, and some were additional, non-SQT samples from other target shoreline locations."
4	Section 1.2 Investigative Approach	Page 3 of 6 (PDF page 8)	Please add text stating that the ex-situ porewater analytical data will also be used to evaluate the potential narcotic effect of PAHs and pesticides on benthic organisms using the sum Toxic Unit approach. The following guidance documents should be considered for this data evaluation: *Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures* (EPA 600-R-02-013) and *Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Procedures for the Determination of the Freely Dissolved Interstitial Water Concentrations of Nonionic Organics* (EPA/600/R-02/012; R.M. Burgess, S.B.K. Driscoll, R.J. Ozretich, D.R. Mount and M.C. Reilly, 2012). The second document summarizes 15 years of research,	The following text will be added to the end of the first paragraph in Section 1.2. "The ex-situ porewater analytical data will also be used to evaluate the potential narcotic effect of PAHs and pesticides on benthic organisms using the sum Toxic Unit approach, as described in USEPA (2012) and USEPA (2003a)." The full citations for these references will be added to Section 3.0 References as follows: "USEPA. 2012. Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Procedures for the Determination of the Freely Dissolved Interstitial Water Concentrations of Nonionic Organics. Office of Research and Development. EPA/600/R-02/012." "USEPA. 2003a. Procedures for the Derivation of Equilibrium Partitioning Sediment

			beginning with Di Toro and his coworkers' development of the equilibrium partitioning (EqP) concept, early efforts by EPA to develop sediment EqP-based benchmarks (such as the 2003 document referenced in NJDEP's comment), and extensive work to develop a comprehensive toxicity dataset focused on narcosis effects.	Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures. Office of Research And Development. EPA/600/R-02/013." The reference for USEPA (2003) will be updated as follows: In Section 1.3: "…(USEPA 2003b)." In Section 3.0: "USEPA. 2003b. Sediment Quality of the NY/NJ Harbor System: A 5-Year Revisit (1993/1994-1998). EPA/902-R-03-002. U.S. Environmental Protection Agency, Region II, Edison, New Jersey."
5	Section 1.2 Investigative Approach / Section 1.2.2 Baseline Human Health Risk Assessment	First paragraph on Page 3 of 6 and second paragraph on Page 4 of 6 (PDF pages 8–9)	When discussing the previous field programs, please state clearly that the 2014 sediment samples (co-located with the softshell clam collection locations) can also support the BHHRA. As written, only the fish and shellfish tissue are listed to support the BHHRA. A similar comment applies to Section 1.2.2.	The last sentence of the first paragraph of Section 1.2 will be revised as follows: "For example, fish and shellfish tissue data collected in 2014, 2015, and 2016 as part of the tissue sampling efforts described in the *Crab and Clam Sampling and Analysis Quality Assurance Project Plan* (Tierra 2014a) and *Fish Sampling and Analysis Quality Assurance Project Plan* (Tierra 2014b), and sediment data collected in 2014 co-located with the softshell clam collection locations, will also be used to evaluate potential ecological and human health risks from exposure to chemicals in the NBSA." The first sentence of Section 1.2.1 will be revised as follows: "The data collected pursuant to the SQT QAPP, in conjunction with additional sediment and

				tissue data collected under the other NBSA risk assessment Quality Assurance Project Plans (i.e., sediment data collected in 2014 co-located with the softshell clam collection locations and fish, crab, and clam tissue data collected in 2014, 2015, and 2016), will collectively support the BERA in evaluating the assessment endpoints for plant, benthic invertebrate, fish, bird, and mammal populations." The first sentence of Section 1.2.2 will be revised as follows: "Sediment data collected during the SQT QAPP field sampling effort, as well as sediment data collected in 2014 co-located with the softshell clam collection locations, will be used to support the BHHRA by assessing the potential human health hazard and risk of chemicals from the dermal contact and incidental ingestion exposure routes."
6	Section 2.0 Field Activities Table 2	Third Bullet on Page 1 of 12 (PDF page 12) and Table 2 (PDF page 27)	Please clarify the third bullet "Sediment, benthic invertebrate, and surface water collection." Surface water was not a targeted matrix (for example, surface water field samples were not collected). Instead surface water was collected and used in the field facility for the shipment of passive samplers (so they would not dry out). A similar comment applies to Table 2; please remove surface water from Table 2 or add a footnote stating that the SQT program did not include	The third bullet in Section 2.0 will be revised as follows: • "Sediment, benthic invertebrate, and surface water collection (surface water was not a targeted sampling matrix, surface water was collected and used in the field facility for the shipment of sediment for porewater analyses)" The following footnote will be added to Table 2:

			collection of surface water field samples for laboratory analysis.	"[3]Surface water was not a targeted sampling matrix. Surface water was collected and used in the field facility for the shipment of sediment for porewater analyses." The legend on Figure 3 will be revised as follows: "Surface Water ~~Sampling~~Collection Location" The following note will be added to Figure 3: "5. SURFACE WATER WAS NOT A TARGETED SAMPLING MATRIX. SURFACE WATER WAS COLLECTED AND USED IN THE FIELD FACILITY FOR THE SHIPMENT OF SEDIMENT FOR POREWATER ANALYSES."
7	Section 2.0 Field Activities	Fifth Bullet on Page 1 of 12 (PDF page 12)	Please delete the phrase "…and sample collection" from the fifth bullet because "collection" is previously identified in the third bullet on Page 1 of 12.	The fifth bullet on page 1 of 12 will be revised as follows: • Sample processing~~ and sample collection~~
8	Section 2.5.1 Procedures Used for Sample Collection	Page 6 of 12 (PDF page 17)	Please note in the text that sediment sample redox conditions likely changed during homogenization in the mechanical mixer, in comparison to the in-situ conditions of each individual sediment grab sample. Please also note that the potential impacts of changes in redox conditions on the ex-situ porewater analytical results will be discussed in the risk assessment's uncertainty analysis.	The following text will be added as a new paragraph after the first paragraph in Section 2.5.1: "Sediment sample redox conditions likely changed during homogenization in the mechanical mixer, in comparison to the in-situ conditions. As described in the USEPA-approved QAPP (Tierra 2015), the homogenized samples in the 5-gallon buckets used for analysis of metals and other inorganics were allowed to sit for two weeks prior to the start of the

				porewater study to re-establish redox conditions since most dissolved inorganics and metals are redox sensitive. The potential impacts of changes in redox conditions on the ex-situ porewater analytical results will be discussed in the risk assessment's uncertainty analysis."
9	Section 2.5.1.2 Toxicity and Bioaccumulation Testing	Page 7 of 12 (PDF page 18)	Please clarify the first sentence of Section 2.5.1.2 by adding the phrases "out of 30" prior to the word "stations" and "(no bioaccumulation testing)" following the word "conducted".	The first sentence of Section 2.5.1.2 will be revised as follows: "For the 22 out of 30 stations where only toxicity testing was conducted (no bioaccumulation testing), one Teflon®-lined 5-gallon plastic bucket was prepared for each station."
10	Figure 3	General Comment (PDF page 40)	Similar to SQT QAPP Figure 1, please identify at each location on Field Report Figure 3 the different types of samples that were collected (especially since only sediment was collected at the BHHRA locations).	Figure 3 will be updated to identify at each location the different types of samples that were collected.
11	Appendix A and Table 1	Appendix A, Protocol Modification Form (PDF page 43) and Table 1 (PDF page 26)	Please compare Appendix A "Protocol Modification Form: Sediment Sampling Locations" with Table 1 on PDF page 26 for accuracy. The Protocol Modification indicates that only three locations were shifted due to utilities; however, Table 1 indicates that four locations were shifted. (Note that the text also states that four sampling locations were shifted due to utilities on PDF page 13.) Please review and revise as necessary.	At the request of USEPA, Location 138 was moved to previously sampled Newark Bay Phase II location NB02SED093, located approximately 1,000 feet north, parallel to the shoreline. As such, this location was not moved for utility clearance reasons. The "Reason for Location Change" on Table 1 for Location 138 will be updated as follows: "Moved at the request of USEPA" Since Section 2.1.2 specifically discusses locations

				moved for utility clearance purposes, the second paragraph of Section 2.1.2 will be revised as follows: "~~Four~~Three proposed sampling stations (~~138,~~ 153, 167, and 173) were relocated prior to implementing the SQT QAPP field program due to their proximity to identified utilities. ~~Location 138 was moved to previously sampled Newark Bay Phase II sampling location NB02SED093, located approximately 1,000 feet north, parallel to the shoreline.~~ Location 153 was moved approximately 75 feet north parallel to the shoreline, location 167 was moved approximately 20 feet south along the shoreline, and location 173 was moved approximately 20 feet south along the shoreline. Each of these new sampling locations remained within the proposed geomorphic areas from the SQT QAPP and were approved by USEPA. A summary of changes is provided in Table 1. The USEPA-approved Protocol Modification Form documenting these sampling location changes is provided in Appendix A." To document USEPA's request to move Location 138, the following text will be added before the last sentence in the first paragraph of Section 2.3.1: "Additionally, prior to the start of sampling activities, Location 138 was moved to previously sampled Newark Bay Phase II sampling location NB02SED093, located

				approximately 1,000 feet north, parallel to the shoreline. The revised sampling coordinates for Location 138 are provided in Table 1."
12	Appendix B	General Comment (PDF page 47)	Please add a cover page to Appendix B to explain the reason for presenting the single laboratory summary report, or cross-reference Section 2.1.4 of the text.	A fly sheet will be inserted at the beginning of Appendix B with the following text: "The analytical results provided in Appendix B are for the Teflon®-liner pre-program field blank collected as part of the sampling pre-mobilization activities. Refer to Section 2.1.4 for additional details."
13	Appendix C	General Comment (PDF page 60)	Please sort Appendix C by Location ID instead of by collection date, so that information can be located more easily. Please confirm that Appendix C is complete, because Location 172 was not readily located and Location 177 appears twice.	Appendix C will be sorted by Location ID instead of by collection date. Appendix C was reviewed for completeness. All forms are present for all sampling locations. Location 177 was included as page 235 of the original report PDF, and Location 172 was included as page 236 of the original report PDF. Appendix C is complete as submitted.
14	Appendix D	General Comment (PDF pages 294-306)	For Locations 136-165, four photographs per locations are presented in Appendix D for the benthic invertebrate community study (Replicate A, Replicate B, Replicate C, and the post-mixing sediment sample). Only a photograph of the post-mixing sample is presented for remaining Locations 166-178. Please confirm that Appendix D is complete as submitted, or include the missing photographs for Locations 166-178.	Locations 166-178 were only collected for sediment chemistry analysis for BHHRA purposes; therefore, no benthic invertebrate samples were collected from these locations. As such, benthic invertebrate sample photographs were not taken for these locations. Appendix D is complete as submitted.
15	Appendix E and Table 5	Appendix E, Sample	For Location 161, USEPA's oversight contractor only collected split samples	The Surface Sediment Sample Processing Form dated 16 September 2015 (Location ID 161) and

		Processing Form (Loc. 161; PDF page 333) and Table 5 (PDF page 36)	for sediment toxicity and bioaccumulation. There was no split sample collected at Location 161 for sediment chemistry. Please correct the Surface Sediment Sample Processing Form dated 16 September 2015 (Location ID 161) and Table 5. (A total of five split samples were collected for sediment chemistry.)	Table 5 will be updated to indicate USEPA's oversight contractor only collected split samples for sediment toxicity and bioaccumulation from Location 161.